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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte THOMAS DANIEL, ULRICH RIEGEL, MATTHIAS WEISMANTEL, NORBERT HERFERT, and FRIEDRICH ENGELHARDT

Appeal 2009-1265
Application 09/831,915
Technology Center 1700

Decided:¹ April 07, 2009

Before TERRY J. OWENS, MARK NAGUMO, and
JEFFREY B. ROBERTSON, *Administrative Patent Judges*.

ROBERTSON, *Administrative Patent Judge*.

DECISION ON APPEAL

¹ The two-month time period for filing an appeal or commencing a civil action, as recited in 37 C.F.R. § 1.304, begins to run from the Decided Date shown on this page of the decision. The time period does not run from the Mail Date (paper delivery) or Notification Date (electronic delivery).

STATEMENT OF THE CASE

Appellants appeal under 35 U.S.C. § 134(a) from the Examiner's rejection of claims 1-7, 10-14, 16-18, 20, 21, 23, and 24.² (App. Br. 5). We have jurisdiction pursuant to 35 U.S.C. § 6(b).³

We AFFIRM.

THE INVENTION

Appellants describe a dried hydrogel prepared by admixing an alkali metal silicate before, during, or after polymerizing an olefinically unsaturated carboxylic acid and before drying the polymerization mixture, post-crosslinking the resulting polymer, and drying the hydrogel at elevated temperature. Appellants assert that the dried hydrogel possesses improved mechanical stability and enhanced permeability of swollen gel particles. (Spec. 2, ll. 15-37).

Claims 1, 10, and 23, reproduced below, are representative of the subject matter on appeal.

1. A dried hydrogel, prepared by

polymerizing an olefinically unsaturated carboxylic acid or its salts in a polymerization reaction mixture;

admixing the polymerization reaction mixture, before, during or after the polymerization and before drying, with an alkali metal silicate of the general formula I

² Claims 8, 9, 15, 19, and 22 have been canceled. (Appeal Brief filed September 28, 2007, hereinafter "App. Br.," 2).

³ Oral Arguments were heard on March 19, 2009.

$M_2O \times n SiO_2$ (I),

wherein M is an alkali metal and n is from 0.5 to 4;

postcrosslinking a resulting polymer;

thereby obtaining a hydrogel containing said postcrosslinked polymer; and

drying said hydrogel at an elevated temperature, to obtain said dried hydrogel;

wherein said postcrosslinking is effected by a crosslinker which is a compound containing two or more groups that form covalent bonds with the carboxyl groups of said polymer.

10. A process for preparing dried hydrogel particles, comprising:

polymerizing an olefinically unsaturated carboxylic acid or its salts in a polymerization reaction mixture, to obtain a solid gel containing a polymer;

admixing the polymerization reaction mixture before or during the polymerization or admixing said solid gel with an alkali metal silicate of the general formula I

$M_2O \times n SiO_2$ (I),

wherein M is an alkali metal and n is from 0.5 to 4;

thereby obtaining particles of a gel;

postcrosslinking said particles of the gel; and

drying said particles of the gel at an elevated temperature, to obtain said dried hydrogel particles;

wherein said postcrosslinking is effected by a crosslinker which is a compound containing two or more groups that form covalent bonds with the carboxyl groups of said particles of the gel.

23. The dried hydrogel according to claim 1, wherein said alkali metal silicate is soluble in water.

THE REJECTIONS

The prior art relied upon by the Examiner in rejecting the claims on appeal is:

Trinh	US 5,429,628	July 4, 1995
Procter & Gamble	WO 97/46195	Dec. 11, 1997
<i>Modern Superabsorbent Polymer Technology</i> 97-101 (Fredric L. Bucholz & Andrew T. Graham eds., Wiley-VCH 1997) (hereafter "Modern Superabsorbent Polymer Technology").		

There are two grounds of rejection under 35 U.S.C. § 103(a) for review on appeal: (1) The Examiner rejected claims 1-3, 6, 7, 10-14, 16, 18, 20, 21, 23, and 24 as being unpatentable over Procter & Gamble in view of Trinh and Modern Superabsorbent Polymer Technology; and (2) the Examiner rejected claims 4, 5, and 17 as being unpatentable over Procter & Gamble as evidenced by or in view of Trinh.

The Examiner found that Procter & Gamble discloses the combination of silica, absorbent gelling materials ("AGM") (polyacrylate), and zeolite as an odour control system in an absorbent article. (Examiner's Answer entered January 28, 2008, hereinafter "Ans.," 4). The Examiner found that Procter & Gamble discloses that sodium silicate is an alternative to silica and that the odour control system may be made by employing spray drying, spray mixing, or agglomeration processes. (Ans. 4). The Examiner found

that Procter & Gamble differs from the claims in sufficiently disclosing the recited materials used in making the dried hydrogels and in the order of the process steps. (Ans. 4). The Examiner found the Trinh discloses AGM is a commercial polyacrylate particle and forming odour control granules in particulate form by adding water blending and drying. (Ans. 4-5). The Examiner determined that it would have been obvious to employ the conventional methods disclosed by Trinh in order to intimately mix alkali metal silicate and polyacrylates. (Ans. 5). The Examiner found that Modern Superabsorbent Polymer Technology discloses surface crosslinking to avoid gel blocking of polyacrylic acids. (Ans. 4). The Examiner determined it would have been obvious to post cross-link Procter & Gamble's odour control systems to avoid gel-blocking. (Ans. 4-5).

Appellants contend that the prior art does not suggest admixing a polymerization mixture and alkali metal silicate before drying. (App. Br. 6). Appellants argue that as a result of the recited method, alkali metal silicate is necessarily distributed inside the obtained gel particles structure of the claimed hydrogels, which is different from the hydrogels of the applied prior art. (App. Br. 6, 7, and 11). Appellants contend that it is impossible for Procter & Gamble to have silica distributed inside AGM because Procter & Gamble discloses mixing particulate materials. (App. Br. 9). Appellants also contend that it is impossible to obtain a mixture of particles where one is distributed within another by wet mixing according to Trinh. (App. Br. 9). Appellants contend that there is no motivation to replace porous silica in Procter & Gamble with alkali silicate. (App. Br. 9).

ISSUE

Have Appellants shown that the recited dried hydrogels or method of making dried hydrogels where alkali metal silicate is mixed with the polymerization mixture after polymerization but before drying are patentably distinct from the dried hydrogels or method of making dried hydrogels, respectively, of Procter & Gamble in view of Trinh and Modern Superabsorbent Polymer Technology, thereby demonstrating reversible error in the Examiner's obviousness determination?

We answer this question in the negative.

FINDINGS OF FACT

The record supports the following findings of fact (FF) by a preponderance of the evidence.

1. Appellants' examples describe producing a solid gel that is subjected to mechanical comminution prior to mixing with alkali metal silicate. (Spec. 7, Inventive Ex. 1; Spec. 10, ll. 36-41; Spec. 11, Table 1, Inventive Exs. 4-9, ll. 30-34; Spec. 11-12, Table 2, Inventive Exs. 10-15).
2. The Declaration of Dr. Manfred Essig ("the Declaration") filed under 37 C.F.R. §1.132 on May 9, 2005, fails to disclose how the dried hydrogels discussed therein are produced.
3. The Declaration does not present any comparative results between the recited hydrogels and the prior art.
4. The third micrograph of the Declaration in the Official Record, said to show the elemental distribution of silicon in the cross

section of particles of the invention, is featureless. (The Declaration, para. 3, third micrograph.)

5. Procter & Gamble states:

[a]ccording to the present invention the odour control system comprises an essential component silica. Silica i.e. silicon dioxide SiO₂ exists in a variety of crystalline forms and amorphous modifications, any of which are suitable for use herein . . . Alternatively the silica may be provided from other sources such as metal silicates including sodium silicate.

(P. 5, 1st full para.).

6. Procter & Gamble states: “[p]referred odour control systems for use herein include the following combinations: . . . silica, AGM and zeolites . . . silica and AGM.” (P. 6, 2nd full para.).
7. Procter & Gamble states: “[t]hese odour control system[s] may be manufactured according to conventional methods, utilizing spray drying, spray mixing or agglomeration processes.” (P. 6, 4th full para.).
8. Trinh states: “[a]s is well known in the art, fluid absorbent gelling materials (sometimes referred to as ‘AGM’ or ‘superabsorbers’) are broadly used in fluid absorbent articles.” (Col. 7, ll. 32-35).
9. Trinh describes the preparation of an odour absorbent material by mixing polyacrylate AGM with zeolite in the presence of water. (Col. 25, ll. 33-51, Ex. 9).
10. Modern Superabsorbent Polymer Technology discloses crosslinking polyacrylate superabsorbent materials by the carboxyl

groups of the polymer chains in order to prevent gel-blocking. (P. 97-99).

PRINCIPLES OF LAW

In an obviousness rejection, the combination of references must be considered as a whole, rather than the specific teaching of each reference. *In re McLaughlin*, 443 F.2d 1392, 1395 (CCPA 1971); *In re Simon*, 461 F.2d 1387, 1390 (CCPA 1972).

ANALYSIS

Appellants have grouped certain claims subject to each of the two grounds of rejection separately. However, Appellants rely on the same arguments for each group of claims. Accordingly, we confine our discussion to appealed claims 1, 10 and 23, which contain claim limitations representative of the arguments made by Appellants, and address other claims only to the extent that Appellants have argued them separately pursuant to 37 C.F.R. § 41.37(c)(1)(vii).⁴

Claim 1

Appellants have not demonstrated that the recited dried hydrogels, where alkali metal silicate is admixed with the polymerization mixture after polymerization and before drying, are patentably distinct from the dried hydrogels of the prior art. Appellants' main contention is that AGM is a dried hydrogel and that mixing AGM with alkali metal silicate would not

⁴ Only those arguments actually made by Appellants have been considered in this decision. Arguments which Appellants could have made but chose not to make have not been considered and are deemed to be waived. See 37 C.F.R. § 41.37 (c)(1) (vii) (2007).

allow the alkali metal silicate to be distributed inside the AGM particle. (App. Br. 7). Appellants point to the Declaration as evidence that the alkali metal silicate is distributed throughout the particles.⁵ (App. Br. 6). We, like the Examiner, do not find the Declaration persuasive. (*See Ans. 9*). The Declaration provides no information as to how “the dried hydrogel according to the present invention” was prepared. (FF 2). Claim 1 recites three different methods by which alkali metal silicate may be admixed with the polymerization mixture; before, during, and after the polymerization of the olefinically unsaturated carboxylic acid. The Declaration does not identify what method(s) was (were) employed. Moreover, the third micrograph allegedly showing the elemental distribution of silicon present throughout the particle is not legible. (FF 4). Therefore, the Declaration fails to provide sufficient evidence to establish that when the alkali metal silicate is admixed with the polymerization mixture after the polymerization has taken place, the alkali metal silicate is distributed within the hydrogel particles.

Even if we were to accept Appellants’ argument that the alkali metal silicate is distributed within the hydrogel particles, Appellants have failed to demonstrate that the Examiner’s rejection including wet-mixing AGM and alkali metal silicate would not result in alkali metal silicate distributed throughout the AGM particle. (App. Br. 9). Appellants contend that because Procter & Gamble discloses that silica acts as a binder, the silica is outside the AGM particles in order to bind the AGM particles together.

⁵ We note that, as the Examiner points out in the Answer, Appellants failed to cite the Declaration as required in 37 C.F.R. §41.37(c)(1)(ix). (Ans. 17). However, both the Examiner and Appellants address the Declaration. Therefore, we shall do so as well.

(App. Br. 8). However, the Declaration provides no comparative results relative to the closest prior art (the applied references) to demonstrate that the structure of the prior art dried hydrogel particles are different. (FF 3). That is, there is no persuasive evidence on the record that the structure of a dried hydrogel is irreversibly fixed upon drying, such that when AGM is wet-mixed with alkali metal silicate, the AGM is incapable of receiving alkali metal silicate within the particle structure.

Claim 10

In addition to the arguments discussed above, Appellants contend that although Modern Superabsorbent Polymer Technology generally discloses post-crosslinking, it does not disclose that an alkali metal silicate is first mixed with a polymer before post-crosslinking. (App. Br. 11). Appellants' argument is misplaced because the Examiner relies on Procter & Gamble and Trinh for disclosing alkali metal silicate and AGM, while the Examiner relies on Modern Superabsorbent Polymer Technology for post-crosslinking in order to prevent gel blocking. As pointed out by the Examiner, Appellants have not challenged the advantages associated with post-crosslinking disclosed by Modern Superabsorbent Technology. (Ans. 14, FN 2).

The Examiner contends that the recitation of "admixing said solid gel" in claim 10 fails to distinguish AGM. The Examiner argues that in such a mixing step, the claims do not require the alkali metal silicate to be distributed throughout the dried hydrogel. (Ans. 8). In reply, Appellants argue that the phrase "solid gel" does not mean that the gel is dry. (Reply Brief filed March 20, 2008, 8). However, Appellants have not timely

produced any persuasive evidence in support of this position.⁶ Further, Appellants' own examples describe that the olefinically unsaturated carboxylic acid is polymerized to form a solid gel and is subjected to mechanical comminution prior to admixing with the alkali metal silicate. (FF 1). Appellants have not sufficiently demonstrated that the methods of producing the solid gel particles in their examples would be any different than admixing AGM with alkali metal silicate in a wet-mixing process. The Examiner also contends that Appellants' claims are open to intermediate drying steps. (Ans. 9). Appellants have not shown that the recited method would be patentably distinct from a method including intermediate drying steps. Therefore, Appellants' arguments are not persuasive.

Appellants also argue that the recited method produces hydrogels that have superior absorbency under load and gel layer permeability. However, Appellants rely on the absorbency under load and gel layer permeability values of the examples relative to the comparative examples of the Specification. (App. Br. 11-14). The comparative examples do not contain any alkali metal silicate as in the closest prior art. Nor have Appellants established that the comparative examples are reasonable comparisons to Procter & Gamble. Therefore, Appellants' evidence of superior results is not persuasive. (Ans. 14 and 15).

Claim 23

Appellants contend that claim 23 is separately patentable because not every sodium silicate is soluble in water as evidenced by Ullmann's

⁶ The pages of Modern Superabsorbent Polymer Technology cited in the Reply were not previously of record, and therefore have not been considered consistent with 37 C.F.R. § 41.41 (a)(2) and (b).

Encyclopedia of Industrial Chemistry, and there is no disclosure in any of the references to use soluble sodium silicate. (App. Br. 18). We agree with the Examiner that in view of Procter & Gamble's preference for non-crystalline amorphous materials, one of ordinary skill in the art would have been led to the water-soluble sodium silicates disclosed in Ullmann's for producing amorphous silicates. (Ans. 16). In addition, Appellants' arguments that there is no motivation to employ an alkali metal silicate solution or that Trinh employs a diatomite particulate material (App. Br. 9) are not persuasive in view of the express suggestion in Procter & Gamble to use alkali metal silicate. (FF 5).

Although claims 2, 3, 6, 7, 11-16, 20, 21, and 24, are listed separately in the arguments, Appellants merely recite the limitations of the claims and do not set forth with any particularity why the Examiner's rejection of these claims is in error. Further, regarding claims 4 and 5, Appellants rely on the same arguments as discussed for claim 1. For claim 17, Appellants merely recite the limitations of the claim and do not set forth with any particularity why the Examiner's rationale rejecting claim 17 is in error. Therefore, these claims fall with the independent claims.

CONCLUSION

Appellants have failed to demonstrate that the recited dried hydrogels or method of making dried hydrogels where alkali metal silicate is mixed with the polymerization mixture after polymerization but before drying are patentably distinct from the dried hydrogels or method of making dried hydrogels of Procter & Gamble in view of Trinh and Modern Superabsorbent Polymer Technology.

ORDER

We affirm the Examiner's decision rejecting claims 1-3, 6, 7, 10-14, 16, 18, 20, 21, 23, and 24 under 35 U.S.C. § 103(a) as being unpatentable over Procter & Gamble in view of Trinh and Modern Superabsorbent Polymer Technology.

We affirm the Examiner's decision rejecting claims 4, 5, and 17 under 35 U.S.C. § 103(a) as being unpatentable over Procter & Gamble as evidenced by or in view of Trinh and Modern Superabsorbent Polymer Technology.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. §1.136(a)(1)(v).

AFFIRMED

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